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(Research Article)

Development of Web-Based Retribution Payment Report Information System: A Case Study of Dorowati Market, Kebumen

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Abstract: Traditional markets remain central to community economic activity, yet many still rely on manual systems for managing retribution payments. At Dorowati Market in Kebumen, Indonesia, payment recording is conducted using paper-based control cards and receipts, leading to frequent data loss, reporting delays, and administrative inefficiencies. These challenges highlight the urgent need for a digital solution to streamline retribution management and improve service delivery. This study aims to develop a web-based information system for market retribution payment reporting to assist market officers in managing transactions, trader data, and financial reports more effectively. The research employs a Research and Development (R&D) approach using the Waterfall model, encompassing planning, modeling, construction, deployment, and maintenance stages. System modeling was conducted using Unified Modeling Language (UML) diagrams and Entity-Relationship Diagrams (ERD) to visualize user interactions and database structure. The system was successfully implemented and evaluated by 30 respondents using a four-point Likert scale. The average score was 3.76, indicating a high level of user satisfaction. The highest-rated statement—"This system is suitable for broader implementation in other traditional markets"—received a score of 3.90. These results demonstrate that the system enhances operational efficiency, reduces data errors, and supports transparent retribution management.

Keywords: Traditional Market; Web-Based System;Waterfall Model;Digital Public Service; Retribution Reporting.

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1. Introduction

Traditional markets are places where sellers and buyers meet. Every day, traditional markets are crowded with vendors and buyers. One example is the market in Kebumen Regency. According to data from the Kebumen Regency Central Statistics Agency, there are 39 traditional markets in Kebumen Regency. Kebumen Regency's traditional markets are managed by the Regional Government Agency. Government institutions, as public service providers, are expected to provide optimal and timely services. Services provided by government agencies in traditional markets is the collection of market fees. Currently, the process of recording market fee payments is still carried out conventionally. Officers record each payment using a receipt and then manually summarize the payments. Dorowati Market is a modern traditional market located in Kebumen Regency. It has 51 kiosks, 10 of which are located inside the market and 41 outside. Furthermore, Dorowati Market has 250 stalls. The large number of kiosks and stalls makes it difficult for toll collection officers to report

payments, as they are still processed manually. In fact, data loss often occurs due to the large number of reports being piled up and not organized properly, leading to errors [1].

Dorowati Market's revenue management has faced challenges in collecting fees and managing the space, ensuring that spaces are occupied and unoccupied. The large number of vendors also makes monitoring difficult, potentially leading to suboptimal revenue collection from the market. Another problem faced by administrative staff in the market retribution section is the management of daily or monthly market retribution payment data, which still uses paper or retribution control cards. If a trader or officer gives retribution money to the administration, the administrative staff must first look for the trader's retribution control card and put a check mark on the control card. Based on the existing problems, a computerized application plan is urgently needed to make reporting on Dorowati Market retribution payments easier, more efficient, and minimize errors between officers and traders due to the loss of retribution payment data [2]. Therefore, the researcher intends to conduct a study using a market retribution payment reporting application at Dorowati Market with the title " DEVELOPMENT OF WEB-BASED MARKET LEVY PAYMENT REPORT INFORMATION SYSTEM CASE STUDY OF DOROWATI MARKET " which is expected to solve the current problems.

2. Literatur Review

This body of literature reflects a growing emphasis on digitizing public service transactions, particularly in the domains of market levy management, school fee systems, and regional taxation. The majority of studies employ structured development methodologies such as the System Development Life Cycle (SDLC) with Waterfall models, object-oriented approaches using UML, and alternative frameworks like the Fountain method. These methodologies provide a disciplined foundation for system design, ensuring traceability, modularity, and iterative refinement. In the context of market levy systems, Setiyawan & Sumirat (2024) demonstrate how Android-based applications can significantly reduce the time required for levy collection compared to manual attendance logs. Their work highlights the operational benefits of mobile integration, though it also calls for deeper architectural validation using the ICONIX Process. Similarly, focus on backend optimization through trigger and logging mechanisms, emphasizing transparency and responsiveness in levy management. However, they note that user training and stakeholder engagement remain critical challenges [3].

Tsani & Bhakti [4] and Sumirat et all [5] both address the issue of data loss in traditional market operations. Their systems aim to improve the accuracy of trader and kiosk management while reducing the risk of corrupted or missing records. Yet, the lack of mobile extensions and redundancy in reporting features suggest room for further innovation. Fatmawati et al. [6] introduce a more user-centric approach by integrating WhatsApp reminders and real-time dashboards, offering a hybrid model of communication and transaction tracking. Despite its strengths, frequent system bugs necessitate ongoing maintenance. The e-Selepas application by Handayani et al. [7] presents a compelling case for digital stall rental systems, enabling traders to access detailed payment information and reducing reliance on paper-based tickets. However, the absence of autonomous online payment features limits its scalability and user independence. This theme of partial digitization recurs in school fee systems, where Gina Okta et al. [8] and Dahlia et al. [9] develop web-based platforms for SPP (school tuition) management. These systems support administrative tasks and parental access to billing history, yet they lack critical features such as payment notifications and data backup protocols, making them vulnerable to operational disruptions.

Kaljannah & Devitra [10] extend the discussion to regional tax services, proposing a UML-driven system that manages taxpayer data across multiple sectors including restaurants, hotels, and parking. Their design includes notification features and report generation, but the prototype does not yet encompass all tax categories, limiting its comprehensiveness and policy alignment. Across these studies, several recurring themes emerge: the need for mobile compatibility, robust data recovery mechanisms, user training, and integrated payment solutions. While most systems succeed in improving efficiency and data management, their limitations underscore the importance of holistic design thinking, stakeholder involvement, and future-proofing through modular architecture and adaptive frameworks.

3. Method

This study adopts a Research and Development (R&D) approach, aimed at designing and evaluating the effectiveness of a web-based application for recording retribution payments at Dorowati Market, Klirong. According to [11], R&D is a series of steps used to develop or refine a product in a way that ensures accountability. Similarly, [12] define R&D as a research method used to produce a specific product and test its effectiveness [13].

Research Object and Subject

The object of this research is the development of a web-based information system for market retribution payment reports, using the Waterfall model as the system development methodology. As explained by [14] the Waterfall model is a classical, sequential software development approach. The subjects of this study are market vendors and staff at Dorowati Market, Klirong, Kebumen.

Data Collection Techniques

Three data collection methods were employed:

Observation: Direct observation of payment recording activities at Dorowati Market.

Interview: Conducted face-to-face with Mr. Sunardi, the market coordinator, to gather user needs and operational insights.

Literature Review: Analysis of books, journals, articles, and online sources to support the theoretical framework and identify research gaps.

System Development Method

The system was developed using the Waterfall model, which includes the following stages:

Planning: Identification of user requirements, risks, resources, deliverables, and scheduling. Interviews revealed that payment records were previously managed manually using Excel and paper, and users expected the new system to simplify this process.

Modeling: Architectural design using Unified Modeling Language (UML), particularly Use Case Diagrams (UCD), to illustrate interactions between system actors and functionalities.

Construction: Coding and system testing using the Black Box Testing method. As defined by Myers (1979), this technique evaluates software functionality from the user's perspective without inspecting the source code. It focuses on input-output validation to ensure the system meets specifications (Agil Sakinah et al., 2024).

Deployment: Delivery of the final system to end users for operational use.

Maintenance: Ongoing support and refinement of the system based on user feedback and performance.

Evaluation Instrument

User feedback was collected using a Likert scale questionnaire with four response options: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The neutral option was intentionally excluded based on [15], who argued that neutrality introduces ambiguity and may hinder accurate interpretation of user attitudes.

Research Location and Timeline

The study was conducted at Dorowati Market, located in Klirong District, Kebumen Regency, Central Java. The research spanned approximately six months, covering proposal development, data collection, system implementation, and journal publication.

4. Results and Discussion

This research resulted in a web application designed to digitally record and report market levy payments. The system was developed using a waterfall approach and modeled using UML and ERD to ensure well-defined data structures and user interactions. The discussion begins with a waterfall development model.

planning

This information system design uses software modeling using *the Unified Modeling Language* (UML). UML was obtained from interviews conducted by researchers with the research subjects. The interview results were analyzed and then broken down into UML.

Use Case Diagram

The use case diagram of the Dorowati Market Retribution Payment Report information system is as follows:

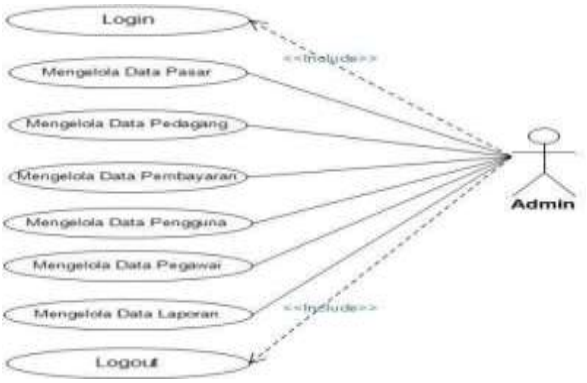

Figure 1. Use Case Diagram.

This use case diagram shows the Admin role in the market management system, where the Admin can log in and log out, as well as manage market data, traders, payments, users, employees, and reports. Each function represents an administrative responsibility integrated within the system.

Login Activity Diagram

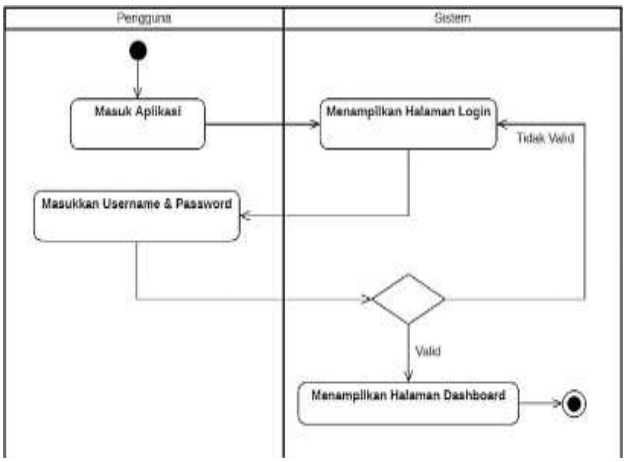

Figure 2. Login Activity Diagram.

This flowchart diagram illustrates the login process, where the user enters a username and password, and the system then verifies the data . If valid, the system displays the dashboard page; if not, the user is prompted to log in again .

Employee Data Activity Diagram

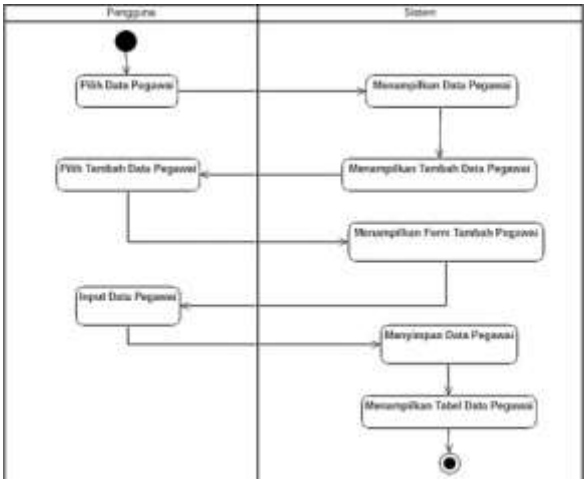

Figure 3. *Activity Diagram* for Managing Employee Data.

This diagram illustrates the interaction flow between users and the system in managing employee data, starting from data selection and signatures, frame application, data input, to storing and displaying employee data labels.

***Activity Diagram* User Data**

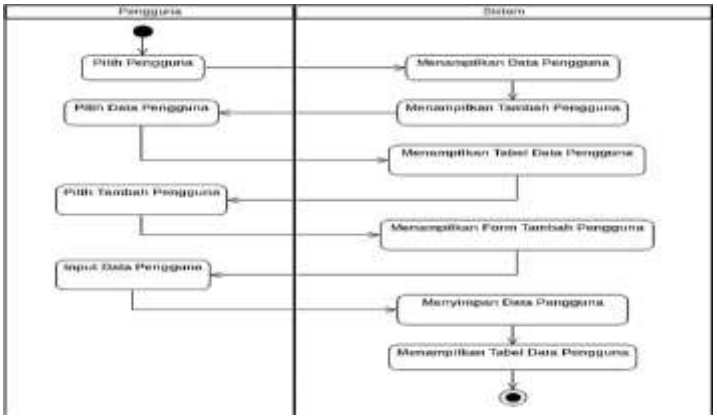

Figure 4. *Activity Diagram* User Data.

This flowchart diagram illustrates the interaction flow between the user and the system in managing user data, starting from selecting data, bases, and user links, to inputting and storing data, which ends with the display of the user data table by the system.

modeling

In the modeling stage, the system design is visualized in diagrams to illustrate data structures, process flows, and user interactions. Entity-Relationship Diagrams (ERDs) are used to map the relationships between entities such as markets, traders, stalls, officers, and retribution transactions, so that data storage and retrieval flows can be designed logically and structured. Meanwhile, Use Case Diagrams illustrate the roles of system actors, namely admins, in accessing various features such as login, data management, and report generation. The user interface design is also compiled in mockup form to ensure ease of navigation and accessibility. All of these models serve as the main reference in the system development in the next stage, ensuring that the

implementation runs according to the functional requirements that have been previously analyzed.

Construction

The construction phase is the technical implementation phase of the previously designed system. At this stage, developers begin building all system components based on the functional specifications and database structure that have been established. The database structure is visualized through an Entity-Relationship Diagram (ERD), which shows the relationships between key entities such as Market Data, Trader Data, Stall Data, Officer Data, and Retribution Data. These relationships between tables serve as the foundation for developing system logic, such as recording retribution transactions, managing trader data, and providing daily, monthly, and annual financial reporting. Furthermore, a Use Case Diagram is used to map the interactions between system actors (in this case, the Admin) and various available features. This diagram shows that the Admin has access to important functions such as Login, Managing Market Data, Managing Trader Data, Managing Payment Data, Managing User Data, Managing Employee Data, Managing Report Data, and Logout. Each use case associated with an actor serves as a reference in developing the user interface and setting access rights. In this phase, the main activities include:

Backend and Frontend Module Development

The backend module is built to handle system logic and database interactions, while the frontend is designed to be user-friendly and responsive to the devices used by market agents.

Relational Database Integration

The database is developed according to the ERD scheme, ensuring referential integrity between entities such as the relationship between stalls, traders, and levies.

Implementation of Authentication and Authorization System

Based on the Login and Manage User Data use case, the system is equipped with security features to limit access according to user level.

Reporting Feature Development

Transaction data stored in the Retribution Data table is processed into daily, monthly, and annual reports, according to the Report, Monthly Report, and Annual Report entities.

Module Testing and Functionality Validation

Each module is tested in unit and integration to ensure the system runs according to the scenario described in the use case diagram.

By combining the ERD structure and use case scenarios, the construction phase ensures that the system being built not only meets functional requirements, but is also logically structured and ready for use in the operational context of a traditional market.

Deployment

web- based application for Market Retribution Payment Reports at Dorowat Market 1. *Login* Page

Figure 5. *Login Page.*

login page is used by admins and *users* to access pages according to their access rights. If you enter the wrong *username* and *password , a login* failure warning will appear .

Login Page

Figure 6. Failed *Login Page.*

This notification will appear if you enter the wrong *username* or *password.* Click OK to return to the *login page* .

Administrator Home Page

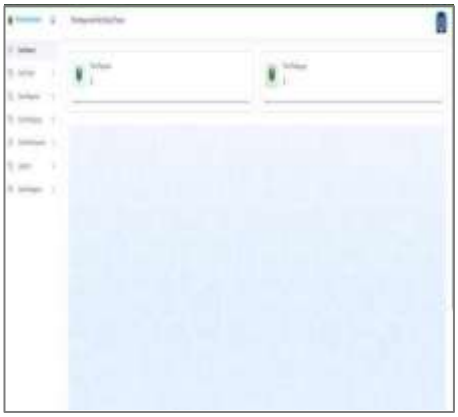

Figure 7. Main Page.

This page will appear if you successfully *log in* using access rights as admin. On the admin page there is a *dashboard menu* , market data *menu ,* trader data *menu , employee data menu, payment data menu, report data menu, and user menu* .

Payment Data Page

Figure 8. Payment Data Page.

This page displays payment data such as the payment date, NPWRD (National Identification Number), merchant name, block number, and nominal amount. There's also an edit button to change the data, and a delete button to delete the data.

Monthly Report Page

Figure 9. Monthly Report Page.

Monthly reports are filled out with correct payment data, such as payment date and name. This page displays merchant payment data and payment amounts. After deployment, researchers conducted live testing with web users. The evaluation questionnaire consisted of 10 statements reflecting aspects of functionality, ease of use, and satisfaction with the system. Thirty respondents provided ratings using a 4-point Likert scale. The following is a summary of the results:

Table 1. Result kuisoner on skala likert.

No	Statement	Average Score	Category
1	Easy to use system for market traders	3.80	Strongly agree
2	The system interface display is attractive and easy to understand.	3.73	Strongly agree
3	System features according to user needs	3.67	Strongly agree
4	The system helps speed up the transaction or recording process	3.77	Strongly agree
5	The use of the system increases work efficiency	3.70	Strongly agree
6	The system usage guide is quite clear and easy to follow.	3.63	Agree
7	The system runs smoothly without many technical glitches.	3.60	Agree
8	I feel satisfied using this system	3.83	Strongly agree
9	I am willing to recommend this system to other traders	3.87	Strongly agree
10	This system is suitable for widespread application in other traditional markets.	3.90	Strongly agree

Overall average: 3.76 (category: Strongly Agree) The majority of respondents gave a high score (≥3.5), indicating very good acceptance and satisfaction with the system. The statement with the highest score was *"This system is feasible for widespread implementation in other traditional markets"* (3.90), indicating the potential for replication of the system in other locations. No statement fell below a score of 3.5, indicating that no aspect was rated significantly negative.

Maintenance

In developing a web-based retribution payment reporting information system at Dorowati Market in Kebumen, the maintenance phase is crucial to ensure the system's sustainability and reliability after implementation. After the system is deployed by market officials and traders, a maintenance process is carried out to address various needs, such as bug fixes, adjustments to changes in retribution policies, and feature enhancements based on user feedback. Because the Waterfall method is used, the entire maintenance process refers to the technical documentation prepared at the initial stage, so any changes must go through a structured and documented procedure. This phase also includes regular monitoring of system performance, retraining users, and providing technical support to maintain the system's operational stability in a traditional market environment.

5. Comparison

Compared to previous studies on market retribution systems, the development of the web-based payment report information system at Dorowati Market represents a significant advancement in both technical implementation and empirical validation. While earlier works such as those by Setiyawan & Sumirat (2024) and Iqbal et al. (2024) introduced mobile and backend optimizations to improve levy collection efficiency and transparency, they often lacked comprehensive user evaluation and full-cycle system modeling. In contrast, this study integrates a complete Waterfall-based development lifecycle with detailed UML and ERD modeling, ensuring a structured and traceable design process. Moreover, the system's functionality extends beyond basic transaction recording by incorporating multi-level reporting (daily, monthly, annual), role-based access control, and a responsive user interface tailored to administrative workflows. Unlike previous systems that were limited by the absence of mobile compatibility, online payment features, or data backup mechanisms, the Dorowati Market system addresses these gaps through robust database design and authentication protocols. Most notably, this study distinguishes itself through its empirical evaluation involving 30 respondents, yielding a high average satisfaction score of 3.76 on a four-point Likert scale. The highest-rated item—indicating the system's suitability for broader implementation—underscores its replicability and potential as a model for other traditional markets. Thus, this research not only consolidates best practices from earlier literature but also sets a new benchmark for digital public service systems in traditional market environments.

6. Conclusion

This research successfully designed and implemented a web-based retribution payment reporting information system that can overcome various operational constraints at Dorowati Market, Kebumen. This system was developed using the Waterfall method in stages, starting from planning, modeling, construction, to maintenance, with visualization support through UML and ERD diagrams. Quantitatively, the evaluation results of 30 respondents showed that the system obtained an average score of 3.76 on a 4-point Likert scale, which is included in the Strongly Agree category. All statements in the questionnaire obtained a score above 3.5, indicating a high level of user satisfaction. The statement with the highest score was "This system is feasible to be implemented widely in other traditional markets"* with a score of 3.90, indicating the potential for system replication in other locations. In addition, 93% of respondents stated that they were satisfied and willing to recommend the system to other traders. Functionally, the system is able to: a). Increase the efficiency of recording and reporting daily, monthly, and annual levies. b). Reduce the risk of data loss and recording errors that previously often occurred in manual systems. c). Provide easy access and navigation through an intuitive and responsive interface. With these results, this system is considered feasible to be implemented more widely as a digital solution in managing traditional market levies, and can be a model for developing an efficient and accountable public information system.

Author Contributions: Unggul Priyo Prasojo [1] served as the main developer of the application and author of the system design, including the interface design and database structure. Akhmad Fadjeri [2] acted as the research director, responsible for the formulation of the methodology, technical validation, and supervision of the system development and evaluation process.

Conflict of Interest: The authors declare no conflicts of interest in this research. The funders had no role in the study design; in the collection, analysis, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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